

## Claims

- [c1] An extraction surface cleaning apparatus having;
- a housing including a base and an upright handle pivotally mounted to the base for manipulation of the base along a surface to be cleaned;
  - a liquid dispensing system mounted to the housing and including:
    - a liquid dispenser for applying liquid to the surface to be cleaned;
    - a fluid supply chamber for holding a supply of cleaning fluid;
    - a fluid supply conduit fluidly connected to the fluid supply chamber and to the liquid dispenser for supplying fluid to the dispenser;
    - a fluid recovery system mounted to the housing and including:
      - a recovery chamber for holding recovered fluid;
      - a suction nozzle;
      - a working air conduit extending between the recovery chamber and the suction nozzle; and
      - a vacuum source mounted to the housing and in fluid communication with the recovery chamber for generating a flow of working air from the suction nozzle through the working air conduit and to the recovery chamber to thereby draw dirty liquid from the surface to be cleaned through the suction nozzle and the working air conduit, and into the recovery chamber;
  - the improvement which comprises:
    - a traction driver mounted to the base for supporting the housing for movement along the surface to be cleaned; and
    - a power drive assembly mounted to the housing and connected to the traction driver for selectively propelling the base over the surface to be cleaned.
- [c2] The extraction surface cleaning apparatus of claim 1 wherein the power drive assembly comprises:
- a drive motor selectively coupled to the traction driver for selectively driving the traction driver in at least one direction and a drive actuator on the handle operably connected to the drive motor for controlling the selective driving of the traction driver by the drive motor.
- [c3] The extraction surface cleaning apparatus of claim 2 wherein the drive motor comprises a reversible electric motor.

- [c4] The extraction surface cleaning apparatus of claim 2 wherein the drive motor comprises an electric motor and the power drive assembly further comprises a transmission assembly operably connected between the electric motor and the traction driver to selectively drive the traction driver in two directions.
- [c5] The extraction surface cleaning apparatus of claim 4 wherein the transmission assembly comprises:  
a first gear train selectively connected between the drive motor and the traction driver for driving the traction driver in a first direction;  
a second gear train selectively connected between the drive motor and the traction driver for driving the traction driver in a second direction; and  
a clutch moveable between the first and second gear train to alternately connect the first and second gear train between the drive motor and the traction driver.
- [c6] The extraction surface cleaning apparatus of claim 5 wherein the drive actuator is operably connected to the clutch mechanism.
- [c7] The extraction surface cleaning apparatus according to claim 6 wherein the upright handle has an upper end portion and the drive actuator comprises a handle grip slidably mounted on the upper end portion of the handle for axial movement along the handle between forward and rearward positions.
- [c8] The extraction surface cleaning apparatus of claim 7 wherein a cable is connected between a handle grip and the clutch.
- [c9] The extraction surface cleaning apparatus according to claim 4 wherein the transmission assembly comprises:  
a flywheel mounted for rotation about a central axis having a pair of parallel radial surfaces;  
the traction driver is non-rotatably mounted on a drive axle and the drive axle is mounted for rotation about an axis parallel and adjacent to one of the flywheel radial surfaces;  
a drive wheel is axially shiftable and non rotatably mounted on the drive axle for rotation therewith, and the drive wheel has an outer circumferential surface that rolls along one of the radial surfaces of the fly wheel to transfer rotary

motion of the fly wheel to rotary motion of the drive axle;  
wherein shifting of the drive wheel along the drive axle changes the gear ratio  
between the fly wheel and the drive wheel.

- [c10] The extraction surface cleaning apparatus of claim 9 wherein a projection of the drive axle onto the one radial surface of the flywheel defines a diametrical line across the flywheel and the drive wheel contact with the flywheel is along the diametrical line, whereby axial shifting of the drive wheel along the drive axle changes the gear ratio and can also change the direction of rotation of the drive axle.
- [c11] The extraction cleaning apparatus of claim 10 and further comprising a worm gear driven by the motor and wherein the flywheel has an outer circumferential gear edge that is driven by the worm gear.
- [c12] The extraction surface cleaning apparatus of claim 1 wherein the power drive assembly includes an air drive turbine motor.
- [c13] The extraction surface cleaning apparatus of claim 1 wherein the power drive assembly comprises a unidirectional electric drive motor and a reversible transmission assembly between the electric drive motor and the traction driver to selectively drive the traction driver in one of two directions.
- [c14] The extraction surface cleaning apparatus of claim 13 wherein the power drive assembly further includes a belt between the transmission assembly and the traction driver.
- [c15] The extraction surface cleaning apparatus of claim 14 and further comprising a belt tensioner assembly mounted to the housing to maintain tension on the belt.
- [c16] The extraction surface cleaning apparatus of claim 15 wherein the belt tensioner assembly comprises a plate slidably mounted to the housing, a pair of wheels rotatably mounted on the plate and the belt is weaved between the wheels so that proper tension is maintained when the belt is driven in either direction.

- [c17] The extraction cleaning apparatus of claim 1 wherein the power drive assembly comprises a drive motor mounted on the housing and a flexible cable in driving relationship at one end with the motor and in driving relationship at the other end with the traction driver.
- [c18] The extraction cleaning apparatus of claim 1 wherein the power drive assembly comprises:  
a wheel sprocket non-rotatably connected to the traction driver for movement therewith, and;  
a drive motor mounted on the housing in driving relationship with the wheel sprocket.
- [c19] The extraction surface cleaning apparatus according to claim 18 wherein the drive motor is mounted to the handle and further comprising a belt operably connected to the drive motor and the wheel sprocket for driving the traction driver.
- [c20] The extraction surface cleaning apparatus according to claim 1 wherein the traction driver comprises a drive brush mounted for rotation about a horizontal axis on the base; and the power drive assembly further comprises:  
a sprocket non-rotatably mounted to the drive brush;  
a drive motor mounted to the housing; and  
a belt drive between the motor and the wheel sprocket for driving the drive brush;  
wherein rotation of the drive brush results in movement of the base across the surface to be cleaned.
- [c21] The extraction surface cleaning apparatus of claim 1 wherein the traction driver comprises:  
a track assembly including:  
a pair of track sprockets mounted on the base for rotation about parallel, horizontally spaced axes; and  
at least one track belt reeved around the track sprocket and in contact with a surface to be cleaned; and  
a drive motor mounted on the housing and operably connected to one of the

track sprockets for selectively driving the same.

- [c22] The extraction surface cleaning apparatus of claim 1 wherein the power drive assembly comprises a drive actuator on the handle for selectively controlling the movement of the base over the surface to be cleaned.
- [c23] The extraction surface cleaning apparatus of claim 22 wherein the drive actuator is adapted to control the forward and reverse movement of the base over the surface to be cleaned.
- [c24] The extraction surface cleaning apparatus of claim 22 wherein the upright handle has an upper end portion and the drive actuator comprises a handle grip slidably mounted on the upper end portion of the handle for axial movement along the handle between forward and rearward positions.
- [c25] The extraction surface cleaning apparatus of claim 24 wherein the drive actuator is biased to a neutral position between the forward and rearward positions for disablement of the power drive assembly.
- [c26] The extraction surface cleaning apparatus of claim 25 wherein the drive actuator further comprises a mounting block slidable on the handle and further comprising a solution valve mechanism in the fluid supply conduit mounted to the sliding block for movement therewith.
- [c27] The extraction surface cleaning apparatus of claim 26 and further comprising a solution valve actuator mounted to the handle grip and connected to the solution valve mechanism to control the flow of cleaning solution through the solution valve mechanism to the liquid dispenser from the solution chamber.
- [c28] The extraction surface cleaning apparatus of claim 25 and further comprising a lock for selectively locking the handle grip in the neutral position.
- [c29] The extraction surface cleaning apparatus of claim 28 wherein the lock comprises an aperture in the handle grip and an aperture in the upper portion of the handle and apertures aligned with each other when the handle grip is in a neutral position; and  
a pin selectively moveable between a locked position wherein the pin is

positioned within both of the apertures and an unlocked position wherein the pin is retracted from at least one of the two apertures.

- [c30] The extraction surface cleaning apparatus of claim 1 and further comprising a carry handle affixed to the upright handle.
- [c31] The extraction surface cleaning apparatus of claim 1 and further comprising at least two wheels mounted to the base for supporting the housing for movement over the surface to be cleaned and wherein the traction driver comprises at least one of the at least two wheels.
- [c32] An extraction surface cleaning apparatus having;
- a housing including a base and an upright handle pivotally mounted to the base for manipulation of the base along a surface to be cleaned;
  - at least two wheels mounted to the base for supporting the housing for movement along the surface to be cleaned;
  - a liquid dispensing system mounted to the housing and including:
    - a liquid dispenser for applying liquid to the surface to be cleaned;
    - a fluid supply chamber for holding a supply of cleaning fluid;
    - a fluid supply conduit fluidly connected to the fluid supply chamber and to the dispensing nozzle for supplying fluid to the dispensing nozzle;
    - a fluid recovery system mounted to the housing and including:
      - a recovery chamber for holding recovered fluid;
      - a suction nozzle;
      - a working air conduit extending between the recovery chamber and the suction nozzle; and
      - a vacuum source mounted to the housing and in fluid communication with the recovery chamber for generating a flow of working air from the suction nozzle through the working air conduit and through the recovery chamber to thereby draw dirty liquid from the surface to be cleaned through the suction and the working air conduit, and into the recovery chamber;
  - a drive motor comprising a unidirectional electric motor mounted on the housing;
  - a transmission assembly operably connected between the drive motor and at

least one of the wheels for selectively connecting the drive motor with the at least one wheel, the transmission assembly including a first gear train selectively connected between the drive motor and the at least one wheel for driving the base in a forward direction;

a second gear train selectively connected between the drive motor and the at least one wheel for driving the base in a reverse direction;

a clutch mechanism moveable between the first and second gear trains to alternately connect the first and second gear trains between the drive motor and the at least one wheel;

a belt drive connecting the transmission assembly to the at least one wheel, the belt drive including a tension adjuster for maintaining a predetermined tension on the belt when the base is driven in the front and the rear directions;

the handle having a grip mounted to an upper end thereof, the grip being slidably mounted on the upper end of the handle between an extended position, a neutral position and a retracted position;

a drive actuator mounted on the grip portion and moveable therewith;

a link between the grip and the clutch to move the clutch between the first gear train and the second gear train and to a neutral position between the two gear trains.